Perspective on Cattle Price Forecasting and Cattle/Beef Market Modeling

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Forecasting cattle prices – fed or calf – is a complicated problem. There are many exogenous variables that impact the system and there are many interrelated endogenous variables. Accounting for all in a simultaneous or reduced form system is difficult. Many variables will be insignificant or structures will appear unimportant in a statistical analysis. There is also much apparent structural change – demand related, market organization, international trade opportunities, and animal improvement.

Because of the complexity and subtlety of the relationships my approach has become simpler. My approach when made formal is to forecast or construct the pieces and combine a net supply change – net of trade – with information on demand shifters. My forecast horizon is also not as long as for example the USDA Baseline Model. Forecasts can be constructed for the fed cattle or beef or wholesale market level and then derived demand information on, for example, feeding costs used to forecast calf prices.

A balance sheet approach is used. But different from grains and different from the WASDE. I do not consider ending stocks or any measure of cold storage. Cold storage can be an issue and impact forecasts but only when cold storage stocks are much larger or much smaller than normal seasonal patterns. Frozen beef is an intermediate step in the production of ground beef products. The quality of frozen beef is inferior and prices reflect that.

My balance sheet starts with animal numbers and attempts to forecast the percent change in animal numbers year to year, quarter to quarter, or quarter to the prior year quarter. Future beef cattle numbers are determined by prior beef cow numbers. Future beef cattle numbers are also determined the proportion of heifers in the slaughter mix – or in the feeding system – and numbers of non-fed animals. There are several moving parts here.

The next step are percent changes in carcass weights. These are mainly influenced by a deterministic trend and seasonality. There is some variation with corn prices or feed costs in general and variation with current fed cattle prices. Carcass weights are very modestly inversely related to feed costs and more significantly related to current fed cattle prices.

Percent changes in numbers are combined with percent changes in weights to produce changes in production or supply. Fresh beef is not storable so supply is consumption. Domestic consumption is net of trade. Net trade are imports less exports. The U.S. imports and consumes low quality lean beef which is mixed with fed beef trimmings to produce ground beef. The U.S. exports some very high-quality beef and large amounts of variety meats and other byproducts. Net trade is added to production to define consumption. Consumption is converted to per capita with domestic population information.

Finally, percent forecasted change in consumption are used with a variety of elasticities to estimate/forecast price changes. My elasticities are far more elastic than published farm-level or wholesale-level numbers. These are my baseline forecasts and then other information is informally incorporated.

Occasionally, substitute meat prices are directly incorporated in the price forecast. But usually only when combined substitute meat supplies are substantially larger or smaller. Likewise, occasionally income effects are directly incorporated in the price forecast. But only when income is substantially improved or the economic outlook is substantially poorer.

The four outlook talks that are provided have this structure informally embedded. Numbers? Weights? Trade? Other meat supplies? Economy? And then a lot of current topics – what's going on that everyone is talking about? Feed costs? Drought and forage? These impact cow and calf prices and future supplies. Packer margins and retail margins? Industry events?

There are then two main variables that I then make use of to modify forecasts. The piece of information that is not much talked about or reported are market-ready inventories or in the vernacular of the industry: "showlist." Showlist is the pens of cattle that feeders are offering to meatpacker buyer for purchase. There is some industry reporting – tightness or abundance in the showlist can be qualitative or a feeling by market participants. Showlist is formally reported nowhere that I am aware of. But there are a number of constructions. I used to use cattle on feed over 120 days. Now I make use of on feed over 150 days. This is calculated by using the current month's cattle on feed inventory and subtracting the prior five months of placements and adding the prior five months of disappearance. This is a proxy for the inventory of long-fed cattle and the more of then that there are then the weaker the sellers position in the market. Some market participants call this leverage. There are other ways to calculate with transactions or shorter interval data. You will not see this in outlook talks but it is my main piece of information – with a reference of where the price is now and likely future price movements.

The second piece is of information involves looking for information on trade. One of the big problems with trade data is the multiple month delay in official data. We learn trade was great and prices have been strong for three months – stronger than expected. And the reverse. I have some work with a student that found both this and the prior point. We could explain forecast errors with trade data – but too late to forecast. Whereas, we could forecast prices with long-fed cattle inventories. The on feed over 150 days worked best.

Another issue we have definitely seen in the 2000's and later data has been improvement in demand. Demand indices that I have seen do not incorporate for beef do not incorporate substitution or income effects – and that research has not been too successful – in incorporating those influences and modifying demand indices. These are clearly important for long blocks of time – 5–6-year time periods – post-1998. The year 1998 was the bottom of the demand side that started in the 1980s and there have been blocks of time with strong demand. These improvements persist multiple years and simple autoregressive terms or errors do not explain the effect for a long enough time period. The suspicion for the cause of the demand improvements are the value-based marketing efforts and the associated alternative marketing agreements that proliferated post-late-1990s.

The last important issue has to be with packing capacity versus cattle supply. For my entire career supplies were less than capacity. That was until 2016-17. Since then supplies are greater than a 5-day week capacity estimate – of which there is no public attempt at this measure. Packers have to run on Saturdays – or have to be incentivized to run on Saturdays. Relative capacity changes the equilibrium wholesale-to-farm margin – it will and must be wider. This will likely change back to the prior situation after the beef cow liquidation due to drought and poor returns through 2022.